Hollinger Corp.
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In the Court of General Sessions in and for the City and County of New York at the December Term, 1876.

HON. JOSIAH SUTHERLAND,

Presiding.

THE PEOPLE *vs.* DANIEL SCHRUMPF. } MISDEMEANOR.

ADULTERATION OF MILK.

ARGUMENT

OF

W. P. PRENTICE,

Counsel to the Board of Health for the Prosecution.

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ARGUMENT OF THE COUNSEL FOR THE PROSECUTION.

Closing argument of W. P. PRENTICE, Esq., in the case of the PEOPLE *vs.* SCHRUMPF, tried upon an indictment for the adulteration of milk, in the Court of General Sessions in New York, December 28, 1876, Judge SUTHERLAND presiding.

May it please the Court and gentlemen of the jury: When we come, at this stage of the proceedings, to take up the points of interest and discussion, which have detained you so long, the first feeling that I have in my mind is one somewhat of commiseration for you, that you have suffered so much, though I believe it to be in a good cause, and then, again, of admiration for your patience, that you have so pleasantly indulged the learned gentlemen who represent the defence, in all their efforts to bring before you the requisite facts to determine this, which for them and their trade shall be the decisive case, as they have promised. Now I confess that I have entered upon the discussion with less

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NOTE.—The indictment against the prisoner, Daniel Schrumpf, was of two counts. The first count charged him with knowledge, "*knowingly* offering and having for sale," etc., etc. The second count was drawn under the ordinance quoted in the argument.

About thirty other milk dealers, under like indictments, most of them members of "The Milk Dealers' Association," were brought to trial at the December term of the court, 1876, and this case was selected as the first to be tried. It was on trial from December 18 to December 28, 1876, adjournment being had over Saturday and Christmas day—Dec. 23 and 25—and in this interval the examination of the Mulford herd of cows was made by Doctors Waller and O'Connor, who testified, on the 27th, to the facts set out in the report in the appendix.

The prisoner was found guilty.

advantages than those which you have been assured of in the learned gentlemen who represent the "distinguished defendant," as the prisoner has been generally called. I confess that to understand the language with which your ears have grown familiar, I have had to take recourse to the dictionary. Yesterday, you will observe, it was necessary to seek a translation of the word *glutinous*, which was termed viscosity. Last night I looked up the term *viscosity*, and found that it means glutinousness. I also, pursuing the same studies and considering the subject which has interested you for these ten days, have found it a long road now coming to its turn, indeed a milky way, and I sought Loomis' Astronomy to find that a milky way is a galaxy. This definition may properly refer to the scientific stars whom you have heard and who have made so distinguished an appearance. Prof. Loomis, speaking of the "Milky Way," says: "To the naked eye it presents merely a diffused milky light, stronger in some parts than in others." Gentlemen, I shall endeavor to show you where the strong parts lie. Now it has been a matter of interest to me, in the discussion which we have had this morning, to discover what the issue, what the case was which the learned counsel for the defendant was proposing. Is it the Board of Health that is on trial? Is the question that of skimmed milk, or is the question that of the success of the distinguished family of the learned professor on the side of the defence in seeking for "samples of pure, healthy cow's milk" which he can compel the witnesses for the prosecution to taste? You know whether it is or not. I think not. We proceed under this ordinance: "No milk which has been watered, adulterated, reduced, or changed in any respect by the addition of water or other substance, or by the removal of cream, shall be brought into, held, kept, or offered for sale at any place in the City of New York, nor shall any one keep, have, or offer for sale in said city any such milk." Now the learned counsel in closing for the defence said that the Court had settled the question that there was no moral guilt in this case, that the defendant was morally innocent. I ask you, gentlemen, to wait until you receive the charge of the Court, for, unless I am

greatly mistaken, the Court will say to you that it has simply dismissed one count of the indictment; that there are two counts, and they embrace the same offence, but as to the moral guilt or innocence of the defendant, this will be for you to determine.

The Court.—The Legislature had constitutional power to authorize the Board of Health to pass the ordinance which I read to the jury, and to declare a violation of it a misdemeanor. There is no question of morality in the case; that question has long been settled in similar cases brought under acts of Parliament.

Mr. Prentice.—It seems to me, in deciding whether or not the prisoner has been guilty, you will have settled a question of great importance. Remember, gentlemen, that you sit in this place representing the community in which you live. You are the people. You are those for whom these ordinances were made, and the public officers in this case are but your representatives and your servants. It will remain to be found and decided whether you shall approve of the action that has been taken for the best interests of the people of New York, or whether you shall accept the result that is proposed to you by the defence, whether you will sweep away all safeguards, take away all limits, and leave the clients of these gentlemen, whether you will leave this class in the community to pursue a trade, whose injuries are well known, without any restriction by law or in courts of justice. Now the vastness of this question may excuse to you the length of the trial and the delay in bringing it to a conclusion. It appears that the daily milk supply of New York embraces a hundred and fifty thousand quarts by the Erie railroad, thirty-six thousand quarts by the Midland railroad.

Mr. Lawrence.—This is not evidence.

Mr. Prentice.—It is an official document.

The Court.—Strictly speaking that is not in evidence.

Mr. Prentice.—Gentlemen of the jury, in my opinion, which I believe is founded upon sufficiently accurate facts, there is brought into the city of New York about 400,000 quarts of milk a day, and to that quantity at least 100,000 quarts of water are

added, making the daily supply of the so-called commercial milk of this city as it is sold here. I ask you to remember the fact at the outset, that we have had the evidence of Mr. Doughty, a milk dealer, about the standard of commercial milk in this city, and it is corroborated by the evidence on the other side, or is at least without any conflict of evidence, and is confirmed by the evidence of our inspectors. Mr. Doughty tells you that the standard of commercial milk in this city is above the standard of the Board of Health, that it does not come down to 100 on the lactometer. Therefore we may safely assume that the milk offered for sale in the city of New York—the commercial milk—is above the standard of the Board of Health, above 100. That evidence is uncontradicted, and you cannot go any further than the evidence. Now the importance of this adulteration, or of an adulteration which shall be carried, as in this case, fifteen degrees below, it is hardly necessary to dwell upon. I read from Beck's work on Adulterations, he says: "It is not without reason, therefore, that the great mortality among children in Paris is ascribed chiefly to the bad quality of the milk with which such a large number are constantly fed." I read from Dr. Voelcker, who is regarded as undisputed authority in this case: "Milk may be regarded as a kind of model food. It supplies all the various elements of nutrition which are required to build up the bony frame and muscular tissue of the young, and, at the same time, supplies materials for supporting respiration and keeping up the animal heat of the body. Undiluted with water, milk is both a readily digestible and valuable, if not indispensable, article of food for children. Breeders of high priced short-horns know full well how essential it is to the early development of a sound and strong frame, round which the flesh and fat may be afterwards deposited in symmetrical forms, not to stint the calf in milk; and it is to be feared that the children of the artisan and the poor in towns, and of the agricultural laborer in the country, are not nearly so well supplied with milk—both as regards quantity and quality—as the progeny of the well-cared-for herd of short horns, or Ayrshire or Devon cows. If it be remembered that the bodily

health of the adult is affected in no small degree by the amount and quality of the food with which the infant, from the time of its birth and throughout the period of childhood, is fed, and also that much physical suffering might be prevented if children were not stinted in a milk diet, it is doubly desirable that the scanty allowance of milk in which the children of the poor are generally indulged should be unadulterated, and of the best quality that can be procured. We hail, therefore, with pleasure, the enforcement of the food adulteration act, for there can be no question that before the act came into practical operation, the milk sold alike to the rich and poor in London and other large towns, was watered much more generally, and to a greater extent, than it is at present, in places where public analysists keep a watch over the milk-men." It is a matter of public record of which the court and you will take cognizance that the Board of Health in this city began its operations in 1867. It found at that time the death rate in this city, of children under five years of age, to be fifty-three per cent. of the whole number of deaths. Now I will not stop to consider the general decrease which has been marked, year by year, in the rate of the mortality in this city, but I will show you this one fact, that in 1875 the death rate of children under five years of age, to whom of most importance is this question of the purity of milk, their principal food, the rate of mortality had decreased to 48¼ per cent. This means, upon the whole mortality, gentlemen, saving the lives of three thousand children per year. That decrease in the rate of mortality is owing, more than anything else, to the safe-guards that have been thrown about them in various ways, and especially their protection in the purity of their food. Now, statistics of writers go further upon this subject, and they say that for every death you may rate twenty-eight cases of serious illness. How vast becomes the calculation—the consideration of influences which are here before you, which, if these learned gentlemen are correct, you are to decide for, or against, for or against a standard, a means of protection and a safe-guard; for or against the limit of adulteration without concern, for the profits of this distinguished defendant, or

the liberty which he claims, about which his counsel has been so anxious. The liberty of what? The liberty of pursuing a dishonest trade, the liberty of evil doing. I tell you, gentlemen, that your verdict in this case will establish or condemn the restrictions upon that liberty, for whose establishment and regulation our government is constituted; it is a liberty conformable to law.

Now the history of the litigation in milk cases is important. You have had constantly presented to you the first trial of such a case, when these same learned counsel and these same scientific gentlemen arrayed for the defence appeared. The prosecution, as represented in this case, did not have at that time the opportunity to make the same defence as in subsequent cases. They did not then show that they had arrived at the test which is produced for your judgment in this case. They had to wait until this case was tried, until the instructions of more than a year had been had, in the learned talk, in the learned lectures of how milk may be adulterated to escape the lactometer, and in the frequent defences instituted in prosecutions by the Board of Health, by these learned gentlemen, until the inspections of milk had been tried by the experience gained in these contests. These public officers who now prosecute, come before you to say we have now arrived, by our experience, by this very instruction from the milkmen's counsel, by the very instruction received from Dr. Doremus, at a test which will stand scrutiny, and we submit it to you. Now, gentlemen, what is this test? In the first place every witness that has been before you, has agreed that a man may know milk; he will be able to test milk and be an expert in milk inspection. You know there are experts of great skill in many trades and in many commodities. In the case of testing milk, a man who has experience will mark defects in it that will pass your eyes and mine. You are able to judge whether these inspectors have experience in judging milk. The witness for the defence, Dr. Vaughan, could distinguish the quality of milk because, as he says, he is "accustomed to handling it." Could Drs. White and O'Connor not test it? But it will be said by the defence, we presented a bottle containing a fluid which they

did not dare to say was milk. You, gentlemen, have now arrived at a point where you, too, will say it was not milk. There is this thing for which they searched the whole country around New York, and could find no place from which it could be derived, except the famous farm of Mulford, distinguished in the researches of the Doremus family. This article they proposed as a standard by which shall be regulated the milk trade of New York, and you will pronounce it, gentlemen, I am convinced, no milk; that it is not for a standard, and my impression is, that such a sample of their evidence will characterize their whole case. If that is their standard, if that is their evidence of milk which they say is from a fair, healthy cow, "a fair sample of the average milk mixed and taken to New York," I trust, gentlemen, you will leave that sample and that trade to the gentlemen for the defence, give it to "the distinguished defendant," nourish him on it in the seclusion to which I hope he will be devoted, and let us see if he, and his friends and associates, will not wish for a better milk, as they should wish for a better and more honest trade. Gentlemen, your verdict will touch such considerations as these. After the first case was tried, we came to another, where many experts were examined whose testimony you have heard here on this trial, but there was no defence except by the cross-examination of this learned gentleman.

Mr. Lawrence.—I was not present; you are mistaken.

Mr. Prentice.—Your associate, Mr. Waehner, was present; I speak of the Joechter case; there was no appeal in that case. Then we came to the Cox case. In that case there was an appeal, and Cox illustrated by his labors in the penitentiary the dangers and difficulties attending a dishonest trade in the City of New York. Now we have finally come to this case, and they propose, after a year or two of litigation, that this shall be the test case. The issue here, as I stated before, is whether the defendant had for sale watered milk. I shall not spend time in discussing whether there was an error of one, two, or three degrees on any of the lactometers, or in any of the tests. This man watered his milk fifteen degrees. Take the lowest standard offered by the gentlemen of the defense of milk. I do not call the sample

from the "*black cow*," I do not call the sample with which it was associated, from the "*bob-tailed cow*," samples of milk. Mr. Charles Doremus told you here that these two samples were similar and alike in their constituents. I call these no samples, except for them; but, even if you propose to admit them, put them in with all the milk, as they wish them put into the milk supply of New York. Remember this "rule of three" which belongs to their model herd. It takes eight cows of theirs to make twelve pints of milk. Now, put their milk into a can of mixed milk of forty quarts, the can of the commercial milk that comes to this city, take these two samples in such a can of milk, determine then its average, and see whether there is a possibility that this defendant, taking all averages and including all errors, had any milk except watered milk. Now one word as to this distinguished gentleman, the prisoner at the bar. He has come before you chivalrously, and glorified by the distinction of representing and defending what some would appear to call a good act, the watering of milk. He has said to you that his milk had been inspected before. He knew the test when the inspector came to his shop, and he read the lactometer; he even discussed with the inspector whether the proper degree on the lactometer was 85 or 90. He said it was 90, so that he knew the test. Now he comes to the stand and says, "I did not do it; my son did not do it;" but, mark it, gentlemen, the defendant does not say he did not know that milk was watered, for he did know that it was watered; there is not a milkman in this city who would not have known that that milk was watered. I do not believe a discussion from books, a discussion of opinions, or any discussion on the lactometer, or the hydrometer, or the other ometers with tediously long names of which we have heard, will withdraw from your observation the fact that this man, by all the evidence in this case, is shown to have had for sale watered milk, and to have known it. But I do not care whether he knew it or not; the question is, did he violate the law? He has been in this business seventeen years. I am not discussing his moral innocence; there is no question of that kind in this case. There is no pretense in this case that

the milk he was offering for sale was "adulterated" with cream. Their witness, Dr. Vaughan, said that, to show a different rate on the lactometer by the addition of cream, we would have to put in an immense amount, and then it would show "viscosity." There is no question of viscosity in this case; it is a question—whether the milk was watered or not. It has been shown that the milk found in the defendant's place looked blue, it ran off the glass, and the inspector tasted it; so that, without even testing it with the lactometer, he could have said that it was watered milk. It was, as the learned professor who has distinguished himself for the defense, upon whom they place their whole reliance, has said, and you will remember the graphic style with which his evidence was given—it was "rich in water." This is a sample as he said which *the Court* will observe was "*rich in water*." It occurred to me this morning, as I was taking my milk, that I had read of another sample of milk that was "rich in water." Without detaining you any length of time, I will refer to the incident told by Charles Dickens in presenting to the people of England the enormities of the so-called farming-schools and boarding-schools, where step-sons and orphans were put away in the country at Dotheboy's Hall, ruled over by Mr. Squeers, who exercised there a most vicious tyranny. Mr. Dickens, by this graphic story of Nicholas Nickleby, which burned its moral into the heart of the English people, produced a great reform—such a reform as I trust, in some measure, will follow your verdict in this case. In the story, Mr. Squeers goes to London to get pupils. Mr. Nickleby meets them at an inn. Mr. Squeers calls for breakfast for the boys, while he is having meat and coffee.

"This is two penny'orth of milk is it, waiter?" said Mr. Squeers, looking in the large blue mug, and slanting it gently, so as to get an accurate view of the quantity of liquid contained in it.

"This is two penny'orth, sir," replied the waiter.

"What a rare article milk is to be sure, in London," said Mr. Squeers with a sigh. "Just fill that mug up with luke-warm water, William, will you?"

"To the werry top, sir?" inquired the waiter. "Why the milk will be drounded."

"Never you mind that," replied Mr. Squeers. "Serve it right for being so dear. You ordered that thick bread and butter for three, did you?"

"Coming directly, Sir."

"You needn't hurry yourself," said Squeers; "there's plenty of time. Conquer your passions, boys, and don't be eager after vittles." As he uttered this moral precept, Mr. Squeers took a large bite out of the cold beef, and recognized Nicholas. "Sit down, Mr. Nickleby," said Squeers, "we are a breakfasting you see." Nicholas did not see that any body was breakfasting except Mr. Squeers; but he bowed with all becoming reverence and looked as cheerful as he could.

"Oh! that is the milk and water, is it William?" said Squeers, "very good, don't forget the bread and butter presently."

At this fresh mention of the bread and butter the five little boys looked very eager, and followed the waiter out with their eyes; meanwhile, Mr. Squeers tasted the milk and water.

"Ah!" said that gentleman, smacking his lips, "here's richness! Think of the many beggars and orphans in the streets that would be glad of this, little boys. A shocking thing hunger is, isn't it, Mr. Nickleby."

"Very shocking, Sir," said Nicholas.

Here is richness, yes! let us think of the widows and orphans in the street who have to suffer by this "richness," by such a standard as is proposed by these learned gentlemen. Now observe how this controversy has been shaped, with what art the particular issue has been concealed. The first point in the trial of such cases, the first point in the movement of public officers to prevent an evil so enormous as this, must depend on some practical mode of detection of fraud. So cumbrous and lengthy a method of detection, involving the necessity of this parade of a whole laboratory, as you saw here, in which, after forty minutes of experiment in the evaporation of milk, the experiment was not concluded, and several parts you had to take upon your im-

agination. Such a method is insufficient. Make it cumbrous, throw difficulties in the way, and you cannot detect one milkman's fraud a day. Perhaps the Milkmen's Association would be willing to offer up the vicarious sacrifice of a "distinguished member" like the prisoner, and the other members would then pursue their trade undetected and unharmed. Therefore, I say the first object of the defence was to get rid of any practical mode of detection. There is in fact but one method of adulteration of milk of which we are really afraid. It is the "*iron-tailed cow*" that does the damage; it is by water. This is the cheapest and most ordinary way. You are not to consider if there are other adulterations; you have not to say that the Board of Health would necessarily fail in the detection and punishment of other offenses. We have here the most common and the readiest adulteration—that by water. You know that the milkmen themselves are interested in this test, and that they are making it constantly. Doughty has told you, that even on the farms, they are testing the milk, and every man who purchases milk knows whether he is buying a good article or not. Officers Jepson and Gardner were police officers of the Sanitary Squad, and made 10,000 tests each. Drs. O'Connor and White have testified, and you have seen a witness on the stand for the defence who claims that he is no scientific man, and has no scientific experience, but who says that these observations are easily and readily made. It is not necessary to talk to you at length of the detection of so plain and palpable a fraud as there is in this case. Gentlemen, you know that every one of you can take that lactometer and test milk yourselves. Take milk which they say is "adulterated with cream," and milk which is diluted with water, and your own good sense and observation will determine that it is possible to distinguish between them. The first thing, then, that the defense strikes at is the instrument used in this practical test. We were told that the lactometer should be brushed away, "that knowledge and science," excuse me for quoting the words, "damn the lactometer." We have a learned professor, on the part of the defence, who meets this instrument as some noble leader of a bovine herd who,

breaking from his accustomed pastures, crosses a railroad track in the gloom of the evening, and seeing the locomotive coming with its dazzling light plunges at it to brush the locomotive away; but it is the bull and not the locomotive that disappears.

Now I ask you to remember this fact, that not one witness in this case has said that the lactometer will not test specific gravity. They all agree to that. "But it is useless," says the learned professor. I say let us determine the specific gravity in the first place. The public officers in this case do not propose to you the lactometer as a test for anything else but specific gravity, but they say that since you know what the specific gravity of good, sound, commercial milk is, and must be, if the milk tested shall fall below that standard on the lactometer, then it is watered. Now, gentlemen, whether that be a correct conclusion or not, you have heard the evidence of all these learned gentlemen who have testified to the value of this test. I shall not take up your time to attempt to meet the quibbles about mistakes of words when they were under the very sharp fire of the cross-examination of the learned counsel. I shall not ask you to determine whether these scientific men, witnesses for the prosecution, are worthy of the place they have occupied in the scientific world for fifteen or twenty or more years; but I will remind you of the fact that as one distinguished author has said, "books follow thoughts, not thoughts books." You have had the book-makers before you; you have had the men before you who determine scientific questions. You have had their opinion, to the effect that after a consideration of all the authorities, and after a review of the whole subject with careful analysis and reason, such as scientific men have learned to use, their opinion, vouched for by their reputation, is *that the lactometer is a sure and practical test of the adulteration of milk by water*, when it is properly tested and is accurate. Now they have said further that as a practical test it is just as accurate as analysis. It is not necessary for us to go to that point; I desire to make it plain. It must be admitted on all sides that analysis can only tell you the amount of water in the milk; the lactometer tells you the same thing. How can you tell from analysis whether water has been

added unless you have some standard? You must settle in the first place how much water ought to be in milk, or analysis will not tell you what has been added. Here is where the defence have made their real and their principal issue. Their attack is not on the lactometer; they can no more meet it than the bull can meet the locomotive; they can no more meet it than you can meet any well ascertained fact. The lactometer has been described to you by the learned witness for the defence, in his graphic style, as beginning with Archimedes. It is not necessary to prove that; it has been admitted in court that it determines specific gravity, and analysis will do no more. It is upon this question of a standard that we have to meet them. This is the real thing at which they aim. You cannot tell, they say, but that this was honest milk, because there is no standard. Then we asked the defence, what is your standard? They answer it ranges from 80 to 130. We asked, can you fix it no closer? "No." How do you know that? "By experience." Their professor made personally twelve observations, and of these seven were against him, and five for him, and the most distinguished of these observations was on the now famous quadruped, which seems to be the peculiar property of the scientific family on the side of the defense. I think I would be justified in calling that tribe of milk cows the "Doremus Cows," and the most distinguished of that family is the mother, perhaps, the so-called "Bob-tailed Cow." We have found her sister nearly related to her in this case. Her milk is produced by the youthful knight errant of the professor's family, who searches "the County of Orange, with its creameries and its rich pastures,"—to quote his own language—and goes straight to the Mulford Farm. You will remember the learned professor's description of the golden crown of Hiero, which Archimedes tested, exclaiming, "Eureka!" "Eureka!" So you will remember how this youthful scion of that scientific house returned from "the creameries of Orange" with "the sample of low gravity milk," that he had been sent for, and may imagine him exclaiming, "Eureka! I have found it, the low gravity milk, the black cow." And the anxious father says, "Have you heard anything of the

bob-tailed cow?" The youth replies, "It is not necessary, I have the black cow, sample number three. Get the other side to taste it, and the case is done." I thought we would trace this cow-relationship a little. I thought we would go one step more. So I asked Mr. Charles Doremus, another member of the family, more about this tribe of cows, which has been hitherto unknown in science. There is no description of any such cows anywhere, except in the evidence of the professor's family. I could read you books without number, but I will take the testimony which you have heard. No such cows were ever known before, therefore I wished to trace them. I said to Charles Doremus, "This sample of milk is very like another we have had?" He was talking about the samples he had in the Kneib case, and about the "bob-tailed cow." "There is another milk, that of the black cow, like this," I said. "Yes, it is," he said, "in whey." "Is it like it, in other respects?" "Yes, sir, in other respects." There are no such cows to be found except in this "Doremus tribe." The black cow and the bob-tailed cow stand together, and when Prof. Doremus goes on to give you a standard of milk, he begins with these. It is from these that he gets his low standard. I will read an extract from Wanklyn, and we shall see if there is not a standard for milk. Wanklyn, page 41, says: "In dealing with milk supply on a large scale, we are little concerned with the possibility of single animals giving abnormal milk, and need only concern ourselves with milk of normal quality, all departures from the standard being looked upon as sophistications." The fact is claimed by him that the normal standard of milk varies, if I remember right, only two degrees. Now I take up a book, "Du Lait," by Marchand, and read this: "Every time that we shall meet a milk of which the corrected density shall be inferior to 1.030 at a temperature of 15 [Centigrade], and which shall contain less than 30 gr. of butter, 50 gr. of lactine, we shall affirm with certainty and without fear, that the milk is falsified." I read from the last edition of Tardieu, the edition of 1862: "In one word, the frauds indicated by the lactodensimeter are certain, but it is far from indicating all frauds." On page 521, I read that "the lactodensimeter is a useful instrument

for the verification of milk. It can show some frauds, but not all." I read from this dictionary of Profs. Tardieu and Blythe, in which they say in the article on milk, page 385: "Mr. F. N. McNamara, of Calcutta, published a short time since the interesting analysis of the milk of a little Bengali cow. His results show how constant the composition of milk is, whether obtained from the much prized and well-fed Alderney, or the poor, ill-nourished Bengali cow." This book I have in my hand, is one that gives a most exhaustive treatment of this whole subject. There are no pet theories in it, such as are to be found in Von Baumhauer, but it reviews the whole subject. Christian Müller's treatise, on page 42, of the edition of 1872, says: "From more than 6,000 samples from Quevenne and Bouchardat, 1.029 appears as the minimum and 1.033 as the maximum. For the hospitals and public institutions in Paris, the minimum is 1.030. From 1842 to 1856 there was an earnest inquiry if these figures could be taken for Switzerland. A great many instruments were distributed to obtain the greatest possible number of data both on the mountains and in the valleys, and there was a great demand for them; so that in 1856 already several hundreds of instruments were in use. The fear of the new instruments closed the mouths of the guilty, and it soon became the rule to close the prosecution by 1.028. So it was in my laboratory." On page 51, he says, "the proving of the specific gravity of milk by means of the aræometer answers the purpose, and for the greatest proportion of cases is sufficient, and in several localities there is no other test." On page 69 he says, "besides, I investigated 286 other cases of market milk. As the average of all tests, I had a number which was not much greater than 1.031. I found one gravity only under 1.029. This was from a spayed cow; the milk had a bitter taste." On page 74 he says: "If we go through all Europe, from land to land, from place to place, from dairy to dairy, from alp to alp, with the lactodensimeter in our hand, and mix constantly the milk of various cows together, we shall find that the milk, which is divided as a trade commodity from the physiological milk, ranges from 1.029 to 1.033."

This answers in one word this question of milk, this commercial milk, and these pseudo criticisms against our lactometer. The real issue in this case is, Shall the standard be that of the milk of a healthy cow? Shall it be a standard of the milk of the cow as she has been found all over the civilized world? Shall it be the standard of the food supply of milk by which nourishment shall be secured to the infant and the sick in the great cities of the civilized world, or shall it be the standard of this model Mulford or Doremus family of cows? Shall it be the standard of the Doremus cows? I say give us a standard such as is accepted elsewhere, and let the citizens of New York have the protection which is accorded to those who live under every well-regulated government in all the world. But it has been said you have no right to use the lactometer. I say on the contrary that the real issue is the standard for sound milk. On this point I will read one or two extracts from well-known books, and then I will pass by this subject. In a work on food, by Edward Smith, published in 1873, after reviewing all the questions with all the experience gained in England, speaking of the addition of water and the subtraction of part of the cream, etc., etc., the author goes on to say of the tests, "the lactometer effects this with readiness and efficiency." Wilson says: "As it (milk) is frequently adulterated with water, the specific gravity is a most important test of the quality, and hence the value of the lactometer." It is said, in the work by Atcherly that "the addition of water is best detected by its (the milk's) specific gravity." "This in a sample of milk was lowered when mixed with its own volume of water, from 1.031 to 1.015." Here I have the correspondence of the Holland Association, the most recent publication of all, published in Cologne, in 1876, in which the adulteration of milk is treated of under the title or head of "Public Health," and this approves the use of the lactometer in determining the specific gravity. So I might go through a number of these works I have here before me. In the Annals of agricultural chemistry which have been used in evidence, Fleischman has said that "the areometer, under all circumstances, is of the highest excellence (ganz vortrefflich) in

proving the watering of milk." The areometer is the lactometer. Gentlemen, I shall not enter upon the discussion of the mechanical operation or construction of this little instrument. You have had the testimony here of very distinguished scientific men, that it was very well made; and it seems to me that one of the most notable failures on the part of the defence was when two of their scientific experts were unable to tell how it should be regulated, and showed upon the stand that they were ignorant of the quotation from the article in Watts' dictionary, in which it appears that in the construction of the lactometer on so very nice a scale the degrees will appear equal. You have heard the testimony of a man who does know how they are constructed, and he has shown to you that the difference in the size of the degrees is the $\frac{1}{35000}$ or $\frac{1}{50000}$ part of an inch. The witnesses for the defence did not know these facts and figures when they testified. They did not know how, in fact, the lactometer was constructed. They did not know what was the test that was prescribed by the very book which they had in their hand. You remember the story of the young lady who entertained company, and was found after a number of evenings to be extremely well posted on a great many subjects; but after a while her conversation lagged, and when an explanation was sought as to the cause of her dullness, she said the fact was that she had been reading the encyclopædia, but had only reached the letter O. These gentlemen got up to the page they quoted about the hydrometer, but they had only read up to a certain point, and not the later pages which we showed to them. It was as conspicuous an example of scientific inaccuracy as was afforded when the learned professor informed you that there was no constant quantity in milk, save the one element, which was sugar. "Examine the serum," said he, "because sugar is always constant." I said to him: "Professor, tell me if on your chart there over your head the sugar is always constant." The reply was: "It varies a little." "How much?" "Well, it varies 3." Said I, what is the highest and what is the lowest point?" "It varies from 6 at one limit to $2\frac{8}{10}$ at the other"—above 60 per cent., if I can read correctly. That is all he knows of the

standard for milk and of its accuracy in the experiment. Gentlemen, is such testimony to be opposed to the opinions which you have heard here, such authorities as have been read in your hearing? But I do not ask you to trust to that proof, I do not ask you to consult these books, nor to read one of them. I ask you simply to trust your own observation and your own judgment. You have seen with your own eyes whether or not this instrument will detect the watering of milk. Now, remember that, in opposition to the experiment on the Mulford herd of the bob-tailed and black cow species, that we have made experiments in searching for low gravity cows—not with a particular object, but to find out what the range was here about New York. Our inspectors tested not only commercial milk, but they made 505 tests of cows at the dairy farms, and found that in all cases of sound, healthy cows the milk was above the standard. There were some apparent exceptions. Did we conceal them? No; we told you the whole story; we gave you all the reports. The defence used one or two reports only in evidence on this point. We have given you all the facts in our possession, and you can judge as well as we. The exceptions we have explained, and we say that the tests made here, the practical tests to determine the standard of New York commercial milk, demonstrate with mathematical certainty that 1.029 is a very low standard—that it is a very fair standard for the purity of milk.

Suppose you agree with these learned gentlemen of the defence, in any respect, you must still remember that the question is not of one, two, three, five, nor of ten degrees in this case, but it is of fifteen degrees of water. Think of it? Twenty-five per cent. of water had to be added to the sample you had before you the other day to bring it down to 90, five degrees above this point of Schrumpf's. The testimony we have had in this case has increased the number of practical tests, for it see ns that out of forty-seven samples that were investigated by the Messrs. Doremus there was a very small proportion that fell below the standard. Accepting the real milk cows of the Mulford and other herds our tests come up to 540, so that our standard is not lowered but if anything it is increased.

Gentlemen, will you say to the milkmen of New York what standard of milk you will have your children take, and what you will give to the poor, and send to the hospitals. You can fix by your verdict the standard. It is of vast importance that nothing should be done to unsettle the standard of pure milk. It is of vast importance that you do not put us all at the mercy of people who are supplying so important an element of health and strength in this community. Now remember commercial milk is mixed milk, it must have an average, and remember, as I said before, that the evidence is uncontradicted in this case that commercial milk, sold in the city of New York, when pure, stands above 100 on the lactometer. Mr. Doughty says he tested 3,000 samples of this commercial milk we are talking about, and out of those 3,000 of Doughty's tests, out of the 540 tests of the Board of Health, out of the 6,000 in Paris, out of the hundreds of those which Müller tells you of in Switzerland, and those which Smith speaks of, you get an enormous aggregate, and opposed to them you have Doremus's five or seven strippers and the twelve observations which Professor Doremus himself made, of which seven were in favor of and five against the lactometer. Do you talk about a doubt in this case upon such evidence? Is it possible to go beyond that? Now I have shown you what the opposing standard is, based upon those samples of milk that you have here before you. I have shown you what the sample test, applied to Schrumpf's milk, was based upon. I have shown you the accepted standard all over the world, and it has been proved by practical tests, and, I think, also by your own observation during this trial. When, I ask you, gentlemen, when you have been brought in to settle and decide this case and make so important a decision, and when the defence have come in to put their best evidence before you, asking that they shall have an unlicensed liberty of trade, such as is claimed by these distinguished counsel; when you sit here upon your oaths to decide according to the evidence, to do what is fair, honest, true, and right, if the evidence proposed, upon which the defence intends to rely, is a fraud, if it is unfair, if it is a deception in the face of the Court, I ask you, gentlemen, will

you not decide the whole case upon the evidence, and characterize the evidence produced by the other side in support of a standard and a test fraudulent in its beginning, fraudulent in its production, and fraudulent in itself, as one upon which they cannot stand, upon which your righteous judgment will not permit them to stand, as one which they shall take away with themselves and go out of Court to the judgment, and to the fair condemnation of every honest man, of every citizen who desires to protect the innocent, the defenceless, and the poor children of this city? Gentlemen, will you approve the fraud of such testimony as that of the defence, or will you condemn it? Am I using too strong language when I speak in harsh terms of this sample of milk which you have had analyzed, and which the learned counsel for the prisoner proposed to-day to withdraw? He says, "Withdraw the samples that young Doremus brought from the Mulford farm!" It is too late to withdraw these. It was on Friday only that we found out where they came from. We had questioned the source; we had admired the research of this professor's family, and on Friday we found out where they had been on the preceding Monday. We had the sample back in Court on this last Wednesday and demonstrated to you that it was unsound milk, that it was rotten, that it was not milk at all. They cannot withdraw it, it is the best thing for justice which they could have done. They have prepared for months to try this case. The learned counsel for the prisoner is exhausted with the research he has made, and he has been complimented by the Court on the success which you have witnessed: "His ingenuity and learning in complicating questions." They have done their best, and it is the same thing we have had before. If that is a fair average sample, if that is the best evidence they can produce, if it is presented to you as a fair, average sample of milk, and you know it is not milk at all, that it is rotten, disgusting stuff, then I say such is their case. You must remember that this same Mulford herd of cows were fed on oat straw, and yet every milker in the Mulford herd—mind you, "the Doremus cows" are not "*milkers*," but "*strippers*"—every milker in the Mulford herd gave milk above the standard. Yes,

one, though fed on oat straw, did get a little hay. Fortunately, young Doremus visited the place, and he saw her eat hay. You were told by other witnesses how he took hay and gave it to her, and then came into court and swore she fed on hay. Is that fair, is that honest? I need not go back to discuss all this evidence. I think I need not discuss much longer the facts. I say that there are no facts upon which you can find a verdict for the defendant, as I believe. It may be, and I am bound to admit, looking at it from one side of the question, that there may be some things which have escaped my observation, but this thing has not escaped my observation. Where there is a fabrication or falsification of evidence, it is one of the earliest principles instilled into the mind of every professional man, of every man who follows that profession in which I glory, which I believe is of the highest honor, and governed by a rule of honor permitting no deception either by inference or by suggestion, it is one of the earliest principles, I repeat, instilled into the mind of the law student on the subject of evidence, that any falsification of evidence, or any fabrication of it, stamps the whole case. Now, if you should excuse the defendant, if you should find he was not guilty—but I do not see how that is possible—yet if you should so find, you would establish a standard for the city of New York from this fraud, and a standard of milk from this Doremus herd of cows. It comes to just that. The famous "number 3 cow," spoken of by the defence in this case, is the standard of milk for New York which they seek by your verdict. Now the lactometer we have offered you as a test for nothing except the specific gravity, and we have said that commercial milk must stand at 100 on the lactometer. I think it has been proved to you that no possible variation of fifteen degrees could occur even on their hypothesis. You will remember that it was probably 25 per cent. of water which was put into the defendant's milk. It is not the lactometer alone that determines the adulteration, but with it the observation of the expert. He knew that the milk was watered before he tried the lactometer. You have been shown three tests, and they all agreed. Yes, you have had one further test, viz., that of the evidence that the defendant knew

it was watered milk. The distinguished defendant who has appeared here as the champion for all the milk dealers—because this is their preferred case, I did not select it—he knew, he read the scale on the lactometer, and he did not attempt to deny it. His skillful counsel drew from him all that was proper for the case. There was to be no mistake; there was no confusion, no lack of skill or ingenuity in getting all from this gentleman that could be got. Therefore his counsel was careful, and asked questions carefully modified. "Did you put any water in your milk?" "No." "Did your son?" "No." Not a question put such as *did you know* whether it was watered or not? There has been a singular transformation in this man. I do not know what it is owing to. I presume the man who, on the 25th of August, sold this milk must necessarily be a different man from the distinguished individual that comes here and swears as to the standard of milk and the use of the lactometer. He came here the other day, and plead at the bar, before this case began, and said "*not guilty.*" He said that he was not guilty of knowingly offering for sale adulterated or watered milk. But he changed his tune; he woke up within two or three days, and as he looked in the glass he beheld Schrumpf, no longer a milk dealer, but "the champion representative of the Milk Dealers' Association." "Schrumpf!" he said to himself, "you said you did not know, you who know everything, and to whom these scientific men are but infants; but when you come on the stand can you say you did not know the reading of the lactometer? Have you not seen it before? You know all about it." He talked English then and with the Inspector, but on the stand he could only speak German. When the standard of milk of the black cow and the bob-tailed cow is mentioned and proven, see the effect on him. He is changed. Then he knew both English and German; now he knows only German. A week ago he did not know that his was watered milk; but now he finds that he knew it all the time. From such effects save us.

Now we leave this man to suffer the just consequences of an offence prohibited by law. I think you will say it is a salutary law, as the learned counsel for the defence has already admitted

that it is. This is an offence which touches the important relations of life, to which I have called your attention—one that bears immediately upon this question of the reduction of the rate of mortality among infants. And I may say if this be a test case, it is one that is to increase or diminish the rate of mortality of the one hundred and thirty thousand infants in this great city. Leaving that, I say that upon the evidence which you will have to discuss, these several propositions have been demonstrated: 1st. That there is a standard for New York milk. Place it where you like, gentlemen. If you do not accept this 1.029, still my proposition is that there is a standard, though the defence denies it. 2d. That 1.029 or its equivalent 100 on the lactometer of the Board of Health, is practical, and it is the only safe standard for the city of New York, otherwise you incur great dangers and great risks. 3d. That the lactometer correctly determines the specific gravity, and in determining the specific gravity upon this standard, determines the question of adulteration by water. 4th. That the milk dealers must be presumed and held to know the article they are selling, just as the baker knows his bread, and the butcher knows his meat. So the milkmen ought to know the article they are selling, at so great a profit, to the people. 5th. That Schrumpf's milk on this day in August was watered, and watered far below the safe standard, and far below any possibility of error in his detection. 6th. That the defendant's milk was watered at least 15 per cent., and thus adulterated, offered by him for sale, against the law and ordinance. 7th. That Schrumpf is guilty, and whether we find him guilty knowingly or not, he is guilty of selling adulterated milk.

Now one word, gentlemen, and I will detain you no longer. I ask you to consider the parties to this litigation. On the one side you have public officers charged as I said before upon their oaths to discharge this duty of protecting the health of the city of New York. Upon so important a question, they have given evidence after careful preparation, testimony of distinguished scientific men, and evidence of the methods of detection adopted all over the world where such necessity arises for such tests and such action. They have concealed nothing. You have had the

whole before you; you have seen the very beginning and the whole course and history of this test, and you have had added to it such practical demonstrations as the prosecution have shown. These are public interests which are involved, and it is because they are public officers that they have thought it necessary to show you who represent the community—for you are the people in this case—fully, frankly, thoroughly, and accurately, all that they have been doing, and what their officer did the day that Schrumpf was found offering watered milk for sale. Now the defendant appears here on behalf of private interests. As I told you before, he claims but one thing, and that is to be allowed to go on and sell this milk, to get rid of the standard, to get rid of detection, to get rid of all methods of procedure, to have a liberty unrestricted by law, to pour this poison over the whole city. I have shown you the influence of your verdict. I have directed your attention to the principal points that have been discussed. I have not sought to go into details. I ask you to take the other facts upon the authority of the witnesses whom you have heard examined. I will say in conclusion that we have come into this case to discharge a duty; we have entered into this litigation, and have made this fight because it was necessary. We have not sought it. We have, as I believe, fought a good fight, we have kept the faith. I trust that you will find that we have done our duty. The rest we leave to you.

APPENDIX.

I.—WITNESSES.

1.— *Witnesses Examined for the Prosecution, in Favor of the Board of Health Tests.*

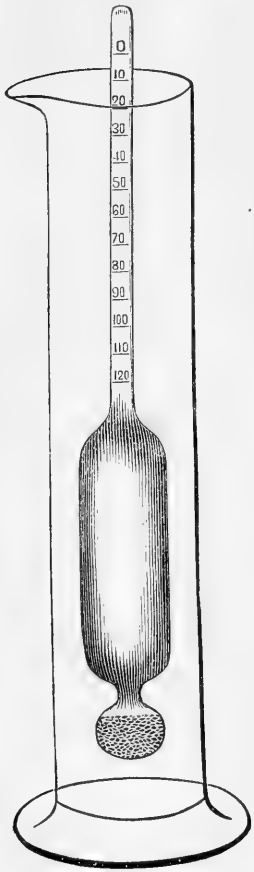
William A. Wall, from the Office of the City Record.
Caspar Golderman, from the Office of the Health Department.
Dr. John B. White, Sanitary Inspector.
Prof. C. F. Chandler, Columbia College.
Prof. C. A. Goessmann, Mass. Agricultural College.
Prof. G. C. Caldwell, Cornell University.
H. Doughty, Manager of the Essex County Farmers' Milk Association.
Prof. Henry Morton, Stevens' Institute.
Prof. Benjamin Silliman, Yale College.
Elwyn Waller, Ph.D., Chemist to the Health Department.
Herman Enderman, Ph.D., Health Department.
John R. Yale, Health Department.
Dr. J. T. O'Connor, Sanitary Inspector.
Henry A. Mott, Ph.D., New York.
Joseph A. Gardner, Sanitary Policeman and Milk Inspector.
James C. Jepson, Sanitary Policeman and Milk Inspector.
Prof. G. F. Barker, University of Pennsylvania.

2.— *Witnesses Examined for the Defence, Opposed to the Board of Health Tests.*

Thomas C. Doremus, New York.
Prof. R. O. Doremus, College of the City of New York.
Dr. C. A. Doremus, New York.
H. W. Vaughn, Milk Inspector, Providence, R. I.
A. S. Casper.
John H. Comer, Accountant and Practical Farmer.
Daniel Schrumpf, Defendant, Milk Dealer.
Jacob Schrumpf, Son of Defendant.

II.—THE LACTOMETER.

1. The lactometer is a hydrometer which indicates specific gravities between 1.000, the gravity of water, and 1.0348.



The Lactometer.

2. It is used to determine the specific gravity of the milk.

3. As the specific gravity varies with the temperature, the observations are made at a standard temperature of 60° Fah.

4. The specific gravity of the average milk at a milking of a healthy cow, properly fed and in a normal condition, varies from 1.029 to 1.0348. The former number being the lowest or minimum gravity, 100° is placed at this point on the lactometer; 0° is placed at 1.000, the gravity of water; the intervening space is divided into 100°, and the graduations are continued to 120°, which corresponds to the specific gravity 1.0348.

5. To apply the lactometer, the temperature of the milk is first noted with the aid of the thermometer; the lactometer is then carefully inserted, taking pains to avoid wetting the portion of the stem above the milk, and to free the surface of the milk from foam. The degree to which the instrument sinks is then noted. Bearing in mind the effect of temperature on the gravity, the inspector now decides whether the gravity will probably be below 100° at 60° Fah. If he thinks it will, he carefully cools or warms a sample of the milk, as the case may require, to 60° Fah., and again inserts the lactometer. If it stands below 100°, the gravity is below that of any genuine milk. He carefully notices the

consistence to determine whether he has before him a sample of *thin* watered milk or a sample of *thick* cream. The black background of the shot in the lower bulb enables the inspector, as the milk runs off the lactometer, to judge of its consistence. The color is also noted, as well as the odor and taste. Low specific gravity (below $100° = 1.029$) together with abnormal watery consistence, and a watery taste, establish the fact of adulteration by water, which is the most common form of adulteration, because the simplest and most convenient.

If the specific gravity be above 100°, it does not follow that the milk is pure and unadulterated. Skimming, by removing the lighter cream, increases the gravity of the milk; so skimmed milk is heavy; but it appears at the same time very thin, and the inspector's attention will be at once arrested by the inconsistency of high gravity and a watery character. In this, as in other cases where the inspector suspects adulteration of any kind which cannot be proved by the above-mentioned tests of gravity, consistence, and taste, he is instructed to take a sample for further examination by the cream test, chemical analysis, and the microscope.

Value of Lactometer Degrees in Specific Gravity.

Lactometer.	Gravity.	Lactometer.	Gravity.
0	1.00000		
1	1.00029	61	1.01769
2	1.00058	62	1.01798
3	1.00087	63	1.01827
4	1.00116	64	1.01856
5	1.00145	65	1.01885
6	1.00174	66	1.01914
7	1.00203	67	1.01943
8	1.00232	68	1.01972
9	1.00261	69	1.02001
10	1.00290	70	1.02030
11	1.00319	71	1.02059
12	1.00348	72	1.02088
13	1.00377	73	1.02117
14	1.00406	74	1.02146
15	1.00435	75	1 02175
16	1.00464	76	1 02204
17	1.00493	77	1.02233
18	1.00522	78	1.02262
19	1.00551	79	1.02291
20	1.00580	80	1.02320
21	1.00609	81	1.02349
22	1.00638	82	1.02378
23	1.00667	83	1.02407
24	1.00696	84	1.02436
25	1.00725	85	1.02465
26	1.00754	86	1.02494
27	1.00783	87	1.02523
28	1.00812	88	1.02552
29	1.00841	89	1.02581
30	1.00870	90	1.02610
31	1.00899	91	1.02639
32	1.00928	92	1.02668
33	1.00957	93	1.02697
34	1.00986	94	1.02726
35	1.01015	95	1.02755
36	1.01044	96	1.02784
37	1.01073	97	1.02813
38	1.01102	98	1.02842
39	1.01131	99	1.02871
40	1.01160	100	1.02900
41	1.01189	101	1.02929
42	1 01218	102	1.02958
43	1.01247	103	1.02987
44	1.01276	104	1.03016
45	1.01305	105	1.03045
46	1.01334	106	1.03074
47	1.01363	107	1.03103
48	1.01392	108	1.03132
49	1.01421	109	1.03161
50	1.01450	110	1.03190
51	1.01479	111	1.03219
52	1.01508	112	1.03248
53	1.01537	113	1.03277
54	1.01566	114	1.03306
55	1.01595	115	1.03335
56	1.01624	116	1.03364
57	1.01653	117	1.03393
58	1.01682	118	1.03422
59	1.01711	119	1.03451
60	1.01740	120	1.03480

III. REPORT OF DOCTORS WALLER AND O'CONNOR ON THE COWS OF THE MULFORD FARM.

NOTE.—Samples of low gravity milk from this farm were introduced by the defence to prove that genuine, unadulterated milk, from healthy, well-fed cows sometimes shows a specific gravity below 1.029 (100° on the lactometer), the standard used by the Board of Health, and others, as the minimum gravity of pure milk.

W. DE F. DAY, M.D., *Sanitary Superintendent.*

SIR:—We have the honor to report that, at the request of the President of the Board of Health, we visited the farm of Mr Charles Mulford, in the neighborhood of Guymard, Orange Co., N.Y., about 80 miles from New York. We reached there on the afternoon of Saturday, December 23d, 1876, and were present at the evening's milking.

His herd consists of some 22 cows, of which but four were at that time regular milkers; eight were "strippers," or cows that were nearly dried up, and the rest were dry. Only the regular milkers were milked that evening.

Evening milking—"milkers;" milked twice a day.

Cow.	Age.	Time since last calf.	Amount yielded.	Test by Lactometer.	Temperature Fahr.
"Charley"	12 years.	3 weeks.	3½ qts.	105	59°
"Blue"	7 "	2 "	4 "	104	61°
"Red Heifer"	5 "	5 "	2 "	100	61°
"Gypsy"	7 "	4 "	4 "	102	59¾°
Total.			13½ qts.		

The cow Charley was stated to be half Ayrshire; all the others were of the common breed.

That evening, after all had retired, Mr. T. C. Doremus and his friend, Mr. Root, arrived, and the next morning (Dec. 24th) the cows were milked in our presence, and the milk tested with the lactometer, both by the above-named gentlemen and by ourselves The results were as follows:

Morning milking—"milkers;" milked twice daily.

Cow.	Amount yielded.	Lactometer.	Temperature F.
"Charley"	6 qts.	108	60°
"Blue"	6 "	112	60½°
"Red Heifer"	4 "	104	60°
"Gypsy"	5 "	107	60°
Total	21 qts.		

"Strippers;" milked but once daily.

Cow.	Amount yielded.	Lactometer.	Temperature.
"Andrew"	½ pint.	104	59°
"Fanny"	1 "	93	59°
"Mooly"	1 "	99	60°
"Ryder"	3 "	103	60°
"Yellow"	3 "	102	60½°
"Spot"	1 "	108	60°
"Star"	1½ "	104	59½°
"Black"	1½ "	78	60°
Total	12½ pints.		

With the exception of the Black cow, all of the strippers were with calf and were expected to be delivered in about 2 or 2½ months. The Black cow had never yielded much milk since her calf was taken from her, and was to be fatted and killed for beef. Her milk looked very thin and watery, and was full of stringy curds which clogged the strainer. Indeed the product from all the strippers was not true milk, and was in no way suitable for domestic use. The product from the pregnant cows was essentially colostrum.

The total yield of the four regular milkers for the evening and morning together, was 34½ quarts, an average of 8⅝ quarts per day from each cow, which is considered a fair average yield for the winter season.

The total yield from the eight strippers was 12½ pints, or an average of 1½ pints per day.

The food of the cows, so far as we saw, was oat-straw only.

Mr. Mulford stated that after that morning he should not again milk the strippers Fanny, Star, Andrew, Mooly, Spot, or Black, until after calving.

Samples of the milk from Fanny, Mooly, and the Black cow, all whose milk stood below 100 on the lactometer, were taken, and, on reaching New York, they were submitted to examination. The results were as follows:

Examination of the low gravity Milk (?) from Strippers.

	Fanny.	Mooly.	Black Cow.
Reaction	Strongly alkaline.	Strongly alkaline.	Strongly alkaline.
Lactometer	93°	99°	78°
Specific Gravity	1.02697	1.02871	1.02262
Cream (?)	11.50 per cent.	No distinct layer.	10.50 per cent.
Water	86.97 "	86.66 per cent.	91.52 "
Fat	4.65 "	3.45 "	1.78 "
Casein and Albumen	5.14 "	7.58 "	4.39 "
Sugar	2.40 "	1.03 "	1.42 "
Salts	0.84 "	1.28 "	0.89 "

Milk from Mooly yielded no well-defined layer of cream. Milk (?) from the Black cow yielded 10.5 per cent. by volume of scum—curdy matter mixed with fat globules. It also deposited a sediment. Respectfully submitted,

ELWYN WALLER, Ph.D.
J. T. O'CONNOR, M.D.

NEW YORK, Jan. 12, 1877.

NOTE.—The sample of milk (?) from the "Black cow" on the "Mulford Farm," produced in court as "pure milk," "standing at 78° on the lactometer," by Mr. T. C. Doremus, before the visit of Doctors Waller and O'Connor, was examined by Prof. Chandler and Dr. O'Connor, who found it after standing a week to exhibit a strong alkaline reaction, which it has not yet lost

after three weeks' standing up to the time this note was written, to deposit a considerable sediment, and to possess a disagreeable taste. Analysis showed it to contain

Water	90.64
Fat	2.64
Casein, Albumen, Sugar,	6.04
Salts	0.68
	100.

The microscope showed the sediment to contain pus corpuscles.

This is an abnormal fluid, which cannot properly be called milk.

Hollinger Corp.
pH 8.5